# *INTELLIGENT SYSTEMS FOR ADVANCED MISSION OPERATIONS*

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## ABSTRACT

Many mission operations systems and tools have been developed over the past decades as NASA has operated the Mars Exploration Rovers, the Space Shuttle, and International Space Station. Usually there is little cross-fertilization between the unmanned mission operations systems and those used for manned spaceflight. NASA Ames Research Center has been developing and applying its advanced intelligent systems research to mission operations tools for both unmanned mars missions operations with the NASA's Jet Propulsion Laboratory since 2001 and to manned operations with NASA Johnson Space Center since 2006. In particular, the lesson learned, and experience and capabilities developed for mission operations systems for the Mars Exploration Rovers have enhanced the development and application of advanced mission operation systems for the International Space Station and future exploration spacecraft. This paper discusses the approaches and strategies that have enabled a variety of intelligent systems technologies to be demonstrated in the unmanned mission operations venues and then imported and adopted as key technologies for manned mission operations. We also discuss several specific projects between the Ames Research Center and the Johnson Space Center's Mission Operations Directorate, and how these technologies and projects will influence the small satellite support system capability being developed at Ames Research Center.